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ABSTRACT

Questionnaires were sent to teachers of grades K-6 in the Silicon Valley area in November 1990 to obtain current information on the utilization and production of media by teachers at this level. This report is based on usable survey instruments returned by 110 teachers, who represented more than 15 different elementary schools. This information was sought for use at San Jose State University, which requires all preservice teachers to take a three-semester unit course in instructional media and technology, and for later comparison with studies of media utilization by K-6 teachers in the Republic of China and Thailand. Individual items were ranked in terms of teacher utilization of media at each grade level. Items were then categorized and placed in related groupings: (1) microcomputers; (2) television (video) and film; (3) still projected media; (4) audio media; (5) models and mock-ups, dioramas, maps and globes, puppets, and field trips; (6) math manipulatives, games and simulations; (7) charts and posters; (8) display boards; (9) graphic and photographic media production and paper materials duplication; (10) centers; and (11) learner arrangements (large group, small group, cooperative learning, and individual self-study). Three figures display the frequency of media use or production activity in each of these categories for K-3 teachers, grade 4-6 teachers, and K-6 teachers. In addition, the Spearman-Brown rank-order correlation formula was used to determine correlation of rankings of media use by primary (K-3) and intermediate (4-6) teachers. Appendices contain lists of media utilized daily by K-6 teachers, as well as daily to weekly, weekly to monthly, monthly to yearly, and less than once a year. These lists are in rank order. (BBM)

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Elementary Teacher Educational Media Utilization and Production in Selected Silicon Valley Schools

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ELEMENTARY TEACHER EDUCATIONAL MEDIA UTILIZATION AND PRODUCTION IN SELECTED SILICON VALLEY SCHOOLS

John E. Morlan and Mei-Yan Lu
San Jose State University
c 1991

Introduction. Educators from the Republic of China, Taiwan; Chulalongkorn University, Thailand; and two universities in California decided it was time to up-date our knowledge concerning the utilization and production of media by teachers in selected elementary schools, grades K-6. The report that follows is based upon a study done in Silicon Valley by John E. Morlan and Mei-Yan Lu, San Jose State University, California. At a later date, comparisons will be made of media utilization by K-6 teachers in California, the Republic of China, and Thailand.

Reasons for conducting the survey. The authors of this report are professors at a large university which requires that all pre-service teachers take a three-semester unit course in instructional media and technology before a preliminary teaching certificate may be issued to the teacher education candidate. We are concerned that we not only prepare prospective teachers for the future, we must also equip them to work effectively in the classrooms of today.

The survey instrument. No survey instrument was available which covered utilization and production of media in sufficient variety and depth. Therefore, an instrument was constructed which was considered adequate for the California study population, and could also be used in the study of media utilization and production by Thai and Chinese elementary school teachers as well. The Instructional Technology faculty at San Jose State University and the faculty of the university in Thailand, as well as selected classroom teachers, reviewed the instrument and gave suggestions for improvement prior to the printing and distribution of the questionnaire.

The Silicon Valley (California) survey. One hundred ten (110) teachers of grades K-6, representing over fifteen (15) different elementary schools, returned usable survey instruments in time for use in this summary report. In addition, eighteen (18) teachers returned forms too late to be included in the study. The survey was implemented on November 15, 1990, and returns were accepted until January 18, 1991.

Schools included in the survey. Schools represented in the survey included several schools located in low income communities, as well as schools located in middle and upper-middle class communities where "High-Tech" research, development and manufacturing companies of Silicon Valley are located.

Statistical treatment. For the purposes of this report, it was determined that a ranking of items in terms of teacher utilization of media at each grade level would be appropriate, using average weighted value for each item in the questionnaire. Items were then categorized and placed into related groupings. Frequency of media use or production activity is presented within each of these groupings. Data are presented for use of media by K-3 teachers; grade 4-6 teachers; and all teachers included in the survey, grades K-6. In addition, the Spearman-Brown rank-order correlation formula was used to determine correlation of rankings of media use by primary (K-3) and intermediate (4-6) teachers.

A grade-by-grade analysis has been completed by the researchers; however, the results of this analysis are not included in this summary report.

Figure 1: RANK ORDER OF TEACHER USE OF MEDIA, GRADES K-3

Key to Numerical Values: Daily Use - 5.0; Weekly Use - 4.0; Monthly use - 3.0
Yearly Use - 2.0; Not used - 1.0

Used daily to weekly: **Bold** Outline
Used weekly to monthly: **Bold**
"Top 50%" Item: *

Microcomputers

Microcomputers for reading/language arts/English as a Second Language	**3.59***
Microcomputers for math/science/health	**3.28***
Desk-top publishing, graphics (newsletters, notices, hand-outs, etc.)	2.17
Microcomputers for social studies	1.68
Microcomputers for other areas (art, music, etc.)	1.59
Interactive computer/laser disk, multimedia CD ROM	1.21
Telecommunications (modem for communication w/others, data bases, etc.)	1.05

Television (Video) and Film

Commercially produced videos (using a video player in the classroom)	2.71*
16 mm film	2.63*
Teacher copied videos (played back on a video player in the classroom)	2.38
Broadcast TV (live) from commercial or educational stations	1.93
Teacher/student made videos (using a video camera)	1.70
Laser video disks	1.37
Closed-circuit television (produced in the school district)	1.33

Still Projected Media

Overhead transparencies, teacher/student made	**3.02***
Filmstrips with cassette sound	2.78*
Overhead transparencies, commercially produced	2.35
Silent Filmstrips	2.09
Opaque projector, for preparing charts and other visuals	1.64
Silent 2 X 2 slides, teacher/student made	1.46
Opaque projector, for projection of the actual materials	1.43
Silent 2 X 2 slides, commercially produced	1.34
Slides with cassette sound, teacher/student made	1.26
Slides with cassette sound, commercially produced	1.11

Figure 1. Media Use K-3 (Cont.)

Audio Media	
Audio cassette, commercially produced	3.63*
Record player	3.45*
Cassette tape, teacher/student made	2.61
Public address system	2.03
CD player	1.16

Models and Mock-ups, Dioramas, Maps and Globes, Puppets, Field Trips	
Maps and Globes, commercially produced	3.42*
Models and Mock-ups, teacher/student made	2.63*
Field Trips, including museums, businesses, nature walks, others	2.46
Puppets, made by the teacher/student	2.43
Puppets, purchased for story telling/reading/dramatization	2.33
Maps and Globes, teacher/student made	2.32
Models and Mock-ups, commercially produced	2.30
Dioramas (three dimensional displays), teacher/student made	2.22
Dioramas (three dimensional displays), purchased	1.42

Math Manipulatives, Games and Simulations	
Math Manipulatives, commercially produced	4.55*
Math Manipulatives, teacher/student produced	4.18*
Games and Simulations, commercially produced	3.54*
Games and Simulations, teacher/student made	3.53*

Charts and Posters	
Charts and Posters, teacher/student made for teaching reading/lang. arts	4.23*
Charts and Posters, purchased for teaching reading/language arts	4.15*
Charts and Posters, purchased for teaching math/science/health	3.35*
Charts and Posters, teacher/student made for teaching math/science/health	3.21*
Charts and Posters, teacher/student made for teaching social studies	2.94*
Charts and Posters, purchases for teaching social studies	2.85*
Charts and Posters, teacher/student made for teaching in other areas	2.77*
Charts and Posters, purchased for teaching in other areas (music, art, sports, etc.)	2.43

Figure 1. Media Use K-3 (Cont.)

Display Boards	
Blackboards (chalkboard) with chalk	4.76*
Bulletin boards/teaching displays, teacher/student made	4.11*
Bulletin boards/teaching displays, purchased	3.22*
White boards with felt markers	2.79*
Chalkboard tools: teacher made	2.60
Felt or flannel boards and materials, commercially made	2.34
Felt or flannel boards and materials, teacher/student made	2.33
Magnetic boards and magnetic board materials, commercially produced	2.02
Magnetic boards and magnetic board materials, teacher/student made	1.48

Graphic and Photographic Media Production, and Paper Materials Duplication	
Hand-lettering for graphics, displays (using felt pens, chalk, etc.)	4.37*
Paper Materials Duplication: Thermal-type (Xerox) copier	4.31*
Paper Materials Duplication: Ditto-type (spirit) duplicator	4.11*
Laminating with heat lamination plastic film	3.03*
Pre-cut paper letters for graphics, displays (commercially produced)	2.62*
Rubber cement mounting (on cardboard)	2.14
Lettering tools and devices for graphic materials	2.08
Photography for producing prints	2.01
Photography for producing slides	1.61
Dry mount press used for mounting pictures	1.31
Silk screen printing on cloth, paper or cardboard	1.24
Wet mounting on cloth	1.02

Centers	
Library/Book Center: Individual classroom	3.80*
Library/Book Center: For the entire school	3.69*
Interest/Discovery Center: Individual classroom	3.52*
Self-Instructional Learning Center: Individual classroom	3.42*
Self-Instructional Learning Center: For the entire school	2.01

Learner Arrangements. Learner arrangements were treated separately, with utilization frequency and rankings done outside of the over-all data treatment.

Media used in "large-group" presentations	3.54*
Media used in "small-group" instruction	2.94*
Media used in "cooperative learning"	2.47
Media used in "individual self-study" situations	2.41

Figure 2: RANK ORDER OF TEACHER TEACHER USE OF MEDIA, GRADES 4-6

Key to Numerical Values: Daily Use - 5.0; Weekly Use - 4.0; Monthly use - 3.0
Yearly Use - 2.0; Not used - 1.0

Used daily to weekly: **Bold** Outline
Used weekly to monthly: **Bold**
"Top 50%" Item: *

Microcomputers

Microcomputers for reading/language arts/English as a Second Language	**3.03***
Microcomputers for math/science/health	2.95*
Microcomputers for social studies	2.86*
Desk-top publishing, graphics (newsletters, notices, hand-outs, etc.)	2.16
Microcomputers for other areas (art, music, etc.)	2.08
Telecommunications (modem for communication w/others, data bases, etc.)	1.31
Interactive computer/laser disk, multimedia, CD ROM	1.07

Television (Video) and Film

Broadcast TV (live) from commercial or educational stations	2.79*
Teacher copied videos (played back on a video player in the classroom)	2.72*
Commercially produced videos (using a video player in the classroom)	2.63*
16 mm film	2.44
Teacher/student made videos (using a video camera)	1.84
Closed-circuit television (produced in the school district)	1.45
Laser video disks	1.11

Still Projected Media

Overhead transparencies, teacher/student made	**3.76***
Overhead transparencies, commercially produced	**3.20***
Filmstrips with cassette sound	2.24
Opaque projector, for preparing charts and other visuals	1.81
Silent Filmstrips	1.80
Opaque projector, for projection of the actual materials	1.68
Silent 2 X 2 slides, commercially produced	1.53
Slides with cassette sound, commercially produced	1.36
Slides with cassette sound, teacher/student made	1.29
Silent 2 X 2 slides, teacher/student made	1.28

Figure 2. Media Use 4-6 (Cont.)

Audio Media	
Audio cassette, commercially produced	3.34*
Public address system	2.52*
Record player	2.40
Cassette tape, teacher/student made	2.30
CD player	1.23
Models and Mock-ups, Dioramas, Maps and Globes, Puppets, Field Trips	
Maps and Globes, commercially produced	3.54*
Maps and Globes, teacher/student made	2.71*
Field Trips, including museums, businesses, nature walks, others	2.49
Models and Mock-ups, teacher/student made	2.08
Dioramas (three dimensional displays), teacher/student made	2.05
Puppets, made by the teacher/student	1.63
Dioramas (three dimensional displays), purchased	1.62
Models and Mock-ups, commercially produced	1.52
Puppets, purchased for story telling/reading/dramatization	1.51
Math Manipulatives, and Games and Simulations	
Math Manipulatives, commercially produced	3.42*
Games and Simulations, teacher/student made	3.07*
Games and Simulations, commercially produced	2.97*
Math Manipulatives, teacher/student produced	2.85*
Charts and Posters	
Charts and Posters, teacher/student made for teaching reading/lang. arts	3.07*
Charts and Posters, purchased for teaching math/science/health	3.15*
Charts and Posters, purchased for teaching reading/language arts	2.98*
Charts and Posters, teacher/student made for teaching math/science/health	2.73*
Charts and Posters, teacher/student made for teaching social studies	2.73*
Charts and Posters, purchased for teaching social studies	2.67*
Charts and Posters, teacher/student made for teaching in other areas	2.33
Charts and Posters, purchased for teaching in other areas (music, art, sports, etc.)	2.16

Figure 2. Media Use 4-6 (Cont.)

Display Boards

Blackboards (chalkboard) with chalk	4.01*
Bulletin boards/teaching displays, teacher/student made	3.81*
Bulletin boards/teaching displays, purchased	3.22*
White boards with felt markers	2.80*
Chalkboard tools: teacher made	2.21
Felt or flannel boards and materials, commercially made	1.47
Magnetic boards and magnetic board materials, commercially produced	1.33
Felt or flannel boards and materials, teacher/student made	1.32
Magnetic boards and magnetic board materials, teacher/student made	1.32

Graphic and Photographic Media Production, Paper Materials Duplication

Paper Materials Duplication: Ditto-type (spirit) duplicator	4.42*
Paper Materials Duplication: Thermal-type (Xerox) copier	4.33*
Hand-lettering for graphics, displays (using felt pens, chalk, etc.)	3.37*
Laminating with heat lamination plastic film	2.96*
Pre-cut paper letters for graphics, displays (commercially produced)	2.59*
Rubber cement mounting (on cardboard)	1.89
Lettering tools and devices for graphic materials	1.83
Photography for producing prints	1.56
Dry mount press used for mounting pictures	1.49
Silk screen printing on cloth, paper or cardboard	1.23
Photography for producing slides	1.20
Wet mounting on cloth	1.06

Centers

Library/Book Center: Individual classroom	3.80*
Library/Book Center: For the entire school	3.69*
Interest/Discovery Center: Individual classroom	3.52*
Self-Instructional Learning Center: Individual classroom	3.42*
Self-Instructional Learning Center: For the entire school	2.01

Learner Arrangements. Learner arrangements were treated separately, with utilization frequency and rankings done outside of the over-all data treatment.

Media used in "large-group" presentations	3.49*
Media used in "cooperative learning"	3.22*
Media used in "individual self-study" situations	2.85*

Figure 3: RANK ORDER OF TEACHER USE OF MEDIA, GRADES K-6

Key to Numerical Values: Daily Use - 5.0; Weekly Use - 4.0; Monthly use - 3.0
Yearly Use - 2.0; Not used - 1.0

Used daily to weekly: **Bold** Outline
Used weekly to monthly: **Bold**
"Top 50%" Item: *

Microcomputers

Microcomputers for reading/language arts/English as a Second Language	**3.31***
Microcomputers for math/science/health	**3.12***
Microcomputers for social studies	2.27
Desk-top publishing, graphics (newsletters, notices, hand-outs, etc.)	2.17
Microcomputers for other areas (art, music, etc.)	1.84
Telecommunications (modem for communication w/others, data bases, etc.)	1.18
Interactive computer/laser disk, multimedia CD ROM	1.14

Television (Video) and Film

Commercially produced videos (using a video player in the classroom)	2.67*
Teacher copied videos (played back on a video player in the classroom)	2.55*
16 mm film	2.44*
Broadcast TV (live) from commercial or educational stations	2.36
Teacher/student made videos (using a video camera)	1.77
Closed-circuit television (produced in the school district)	1.39
Laser video disks	1.24

Still Projected Media

Overhead transparencies, teacher/student made	**3.39***
Overhead transparencies, commercially produced	2.78*
Filmstrips with cassette sound	2.51*
Silent Filmstrips	1.94
Opaque projector, for preparing charts and other visuals	1.72
Opaque projector, for projection of the actual materials	1.55
Silent 2 X 2 slides, commercially produced	1.44
Silent 2 X 2 slides, teacher/student made	1.37
Slides with cassette sound, teacher/student made	1.37
Slides with cassette sound, commercially produced	1.28

Figure 3. Media Use K-6 (Cont.)

Audio Media	
Audio cassette, commercially produced	3.49*
Record player	2.92*
Cassette tape, teacher/student made	2.45*
Public address system	2.27
CD player	1.20
Models and Mock-ups, Dioramas, Maps and Globes, Puppets, Field Trips	
Maps and Globes, commercially produced	3.48*
Maps and Globes, teacher/student made	2.51*
Field Trips, including museums, businesses, nature walks, others	2.47*
Models and Mock-ups, teacher/student made	2.36
Dioramas (three dimensional displays), teacher/student made	2.13
Puppets, made by the teacher/student	2.03
Puppets, purchased for story telling/reading/dramatization	1.92
Models and Mock-ups, commercially produced	1.91
Dioramas (three dimensional displays), purchased	1.52
Math Manipulatives, and Games and Simulations	
Math Manipulatives, commercially produced	3.98*
Math Manipulatives, teacher/student produced	3.52*
Games and Simulations, teacher/student made	3.33*
Games and Simulations, commercially produced	3.25*
Charts and Posters	
Charts and Posters, teacher/student made for teaching reading/lang. arts	3.64*
Charts and Posters, purchased for teaching reading/language arts	3.56*
Charts and Posters, purchased for teaching math/science/health	3.25*
Charts and Posters, teacher/student made for teaching math/science/health	2.97*
Charts and Posters, teacher/student made for teaching social studies	2.84*
Charts and Posters, purchases for teaching social studies	2.76*
Charts and Posters, teacher/student made for teaching in other areas	2.55*
Charts and Posters, purchased for teaching in other areas (music, art, sports, etc.)	2.29

Figure 3. Media Use K-6 (Cont.)

Display Boards

Blackboards (chalkboard) with chalk	4.38*
Bulletin boards/teaching displays, teacher/student made	3.96*
Bulletin boards/teaching displays, purchased	3.24*
White boards with felt markers	2.80*
Chalkboard tools: teacher made	2.40
Felt or flannel boards and materials, commercially made	1.90
Felt or flannel boards and materials, teacher/student made	1.80
Magnetic boards and magnetic board materials, commercially produced	1.68
Magnetic boards and magnetic board materials, teacher/student made	1.44

Graphic and Photographic Media Production, Paper Materials Duplication

Paper Materials Duplication: Thermal-type (Xerox) copier	4.32*
Paper Materials Duplication: Ditto-type (spirit) duplicator	4.27*
Hand-lettering for graphics, displays (using felt pens, chalk, etc.)	3.87*
Laminating with heat lamination plastic film	3.00*
Pre-cut paper letters for graphics, displays (commercially produced)	2.60*
Rubber cement mounting (on cardboard)	2.01
Lettering tools and devices for graphic materials	1.95
Photography for producing prints	1.79
Photography for producing slides	1.41
Dry mount press used for mounting pictures	1.40
Silk screen printing on cloth, paper or cardboard	1.23
Wet mounting on cloth	1.09

Centers

Library/Book Center: Individual classroom	4.00*
Library/Book Center: For the entire school	3.80*
Self-Instructional Learning Center: Individual classroom	3.10*
Interest/Discovery Center: Individual classroom	3.06*
Self-Instructional Learning Center: For the entire school	2.13

Learner Arrangements. Learner arrangements were treated separately, with utilization frequency and rankings done outside of the over-all data treatment.

Media used in "large-group" presentations	3.51
Media used in "small-group" instruction	3.12
Media used in "cooperative learning"	2.84
Media used in "individual self-study" situations	2.63

CORRELATION OF PRIMARY GRADE TEACHER MEDIA UTILIZATION WITH INTERMEDIATE GRADE TEACHER MEDIA UTILIZATION

The Spearman-Brown rank-order correlation formula was used to compare the utilization practices of primary teachers with that of the intermediate teachers. A rank-order correlation of .24 was found to exist, indicating that there were significant differences in the frequency of utilization of certain media in the two groups of teachers included in the study.

CONCLUSIONS AND RECOMMENDATIONS

Preliminary examination of the data indicates that many introductory media and technology courses, and texts written to support these courses, may need revision if the needs of the beginning elementary teacher are to be sufficiently met. We need to prepare future teachers to deal with what is, while preparing them for what is to come.

Additional studies need to be done with larger populations of teachers representing other regions of the country. Middle school teachers and secondary school teachers also need to be surveyed, to determine the use of the media in their classes. Finally, a study of the use of educational media and technology by college instructors needs to be undertaken. These studies should help us as we revise our courses to meet the needs of our pre-service and in-service teachers.

Additional analysis of data shall be done during the 1991 Spring Semester. Utilization of media by K-6 teachers in Thailand and China will be compared, and a report prepared for distribution to interested parties.

Research report prepared for the 1991 AECT International Conference, Orlando, Florida, February 12-18, by:

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APPENDIX

Teacher Rankings of Media Utilization

by

Primary Grades (K-3)
Intermediate Grades (4-6)
Total (Grades K-6)

UTILIZATION OF MEDIA BY TEACHERS GRADES K-6
MEDIA USED DAILY TO WEEKLY
PRESENTED IN RANK ORDER

Blackboards (chalkboard) with chalk	4.38*
Paper Materials Duplication: Thermal-type (Xerox) copier	4.32*
Paper Materials Duplication: Ditto-type (spirit) duplicator	4.27*
Library/Book Center: Individual classroom	4.00*

UTILIZATION OF MEDIA BY TEACHERS GRADES K-6
MEDIA USED WEEKLY TO MONTHLY
PRESENTED IN RANK ORDER

Math Manipulatives, commercially produced	3.98*
Bulletin boards/teaching displays, teacher/student made	3.96*
Hand-lettering for graphics, displays (using felt pens, chalk, etc.)	3.87*
Library/Book Center: For the entire school	3.80*
Charts and Posters, teacher/student made for teaching reading/lang. arts	3.64*
Charts and Posters, purchased for teaching reading/language arts	3.56*
Math Manipulatives, teacher/student produced	3.52*
Audio cassette, commercially produced	3.49*
Maps and Globes, commercially produced	3.48*
Overhead transparencies, teacher/student made	3.39*
Games and Simulations, teacher/student made	3.33*
Microcomputers for reading/language arts/English as a Second Language	3.31*
Games and Simulations, commercially produced	3.25*
Charts and Posters, purchased for teaching math/science/health	3.25*
Bulletin boards/teaching displays, purchased	3.24*
Microcomputers for math/science/health	3.12*
Self-Instructional Learning Center: Individual classroom	3.10*
Interest/Discovery Center: Individual classroom	3.06*
Laminating with heat lamination plastic film	3.00*

UTILIZATION OF MEDIA BY TEACHERS GRADES K-6
MEDIA USED MONTHLY TO YEARLY
PRESENTED IN RANK ORDER

Charts and Posters, teacher/student made for teaching math/science/health	2.97*
Record player	2.92*
Charts and Posters, teacher/student made for teaching social studies	2.84*
White boards with felt markers	2.80*
Overhead transparencies, commercially produced	2.78*
Charts and Posters, purchases for teaching social studies	2.76*
Commercially produced videos (using a video player in the classroom)	2.67*
Pre-cut paper letters for graphics, displays (commercially produced)	2.60*
Charts and Posters, teacher/student made for teaching in other areas	2.55*
Teacher copied videos (played back on a video player in the classroom)	2.55*
Filmstrips with cassette sound	2.51*
Maps and Globes, teacher/student made	2.51*
Field Trips, including museums, businesses, nature walks, others	2.47*
Cassette tape, teacher/student made	2.45*
16 mm film	2.44*
Chalkboard tools: teacher made	2.40
Models and Mock-ups, teacher/student made	2.36
Broadcast TV (live) from commercial or educational stations	2.36
Charts and Posters, purchased for teaching in other areas (music, art, sports, etc.)	2.29
Microcomputers for social studies	2.27
Desk-top publishing, graphics (newsletters, notices, hand-outs, etc.)	2.17
Dioramas (three dimensional displays), teacher/student made	2.13
Self-Instructional Learning Center: For the entire school	2.13
Puppets, made by the teacher/student	2.03
Rubber cement mounting (on cardboard)	2.01

UTILIZATION OF MEDIA BY TEACHERS GRADES K-6
MEDIA USED LESS THAN ONCE A YEAR
PRESENTED IN RANK ORDER

Lettering tools and devices for graphic materials	1.95
Silent Filmstrips	1.94
Felt or flannel boards and materials, commercially made	1.90
Microcomputers for other areas (art, music, etc.)	1.84
Felt or flannel boards and materials, teacher/student made	1.80
Photography for producing prints	1.79
Teacher/student made videos (using a video camera)	1.77
Opaque projector, for preparing charts and other visuals	1.72
Magnetic boards and magnetic board materials, commercially produced	1.68
Puppets, made by the teacher/student	1.63
Dioramas (three dimensional displays), purchased	1.62
Opaque projector, for projection of the actual materials	1.55
Models and Mock-ups, commercially produced	1.52
Puppets, purchased for story telling/reading/dramatization	1.51
Silent 2 X 2 slides, commercially produced	1.44
Magnetic boards and magnetic board materials, teacher/student made	1.44
Photography for producing slides	1.41
Dry mount press used for mounting pictures	1.40
Closed-circuit television (produced in the school district)	1.39
Silent 2 X 2 slides, teacher/student made	1.37
Slides with cassette sound, teacher/student made	1.37
Slides with cassette sound, commercially produced	1.28
Laser video disks	1.24
Silk screen printing on cloth, paper or cardboard	1.23
Silk screen printing on cloth, paper or cardboard	1.23
CD player	1.20
Telecommunications (modem for communication w/others, data bases, etc.)	1.18
Interactive computer/laser disk, multimedia CD ROM	1.14
Wet mounting on cloth	1.09